

# MISSOURI CONSERVATIONIST

VOLUME 81, ISSUE 3, MARCH 2020  
SERVING NATURE & YOU





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## MISSOURI CONSERVATIONIST



### ON THE COVER

Painted devil crayfish

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# Inbox



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PO BOX 180  
JEFFERSON CITY, MO 65102



## SPECTACULAR PHOTOGRAPHY

Danny Brown, that's the most spectacular article and photography I've ever seen and right among us [*St. Louis: Where Birds of Prey Abound*; November; Page 18]. Thank you!

Patricia Kiesov  
Aurora

## FOR THE LOVE OF ANIMALS

I am an 11-year-old who loves nature and the outdoors. I read *Xplor* magazine, but I also enjoy the *Missouri Conservationist*. I really like articles about animals, such as the one about wolf spiders in the October 2019 magazine [*Little Wolves of Missouri*; Page 11]. My favorite article was the one about opossums [*Awesome Opossums*; August; Page 22]. I really liked the mouse on the back cover of the January issue. Mice are the best!

Shaelyn Butler Springfield

## OH THE PLACES YOU CAN GO

Before reading the January issue of the *Missouri Conservationist*, I had no idea that an area like Bilby Ranch Lake existed in Missouri [*Places to Go*; Page 30]. The description by Manager Craig Crisler has me already wanting to plan a trip! I grew up hunting quail with my dad and brother in central Missouri. I would love to take my son to Bilby Ranch so he can experience the thrill of the sound of a flushing covey of quail and the excitement of a clucking pheasant taking flight. Thank you for the article and the chance of a new hunting adventure.

Jay Dunham Eldon

## CONSERVATIONIST AROUND THE WORLD

Born and raised enjoying the beauty of southern Missouri at Greer Spring and later in Crawford County, I am so grateful my love of the outdoors began at such a young age. Leaving Missouri for school and later moving to Canada, I thoroughly enjoy and look forward to my *Missouri Conservationist* every month (thanks, Mom). Every issue is always wonderfully written, full of great and practical information, and has photography that really shows the beauty of our great state. I can't say how proud and impressed I am with Missouri's conservation efforts. Thank you, MDC!

Meegan Gildehaus Beslic British Columbia

## WINTER QUAIL STUDY

As a former quail hunter, it was refreshing to read the preliminary results of the Dade County quail study, especially about the importance of "heavy woody components" [*Nature Lab*; January; Page 4].

The study noted the "decreased survival" within two years of a prescribed burn. Will this affect the prescribed burning on areas such as Hi Lonesome and the Mora Wildlife Areas?

Neil Heimsoth Cole Camp



Northern bobwhite

*Editors' Note:* According to MU graduate research assistant Alisha Mosloff, "This study is part of a larger bobwhite research project that aims to evaluate quail survival and the factors affecting survival throughout a bobwhite's entire annual life cycle. MDC managers will evaluate the results presented in this article, which were fall and winter specific, alongside spring and summer results to select management techniques, which will improve quail survival throughout the entire year."

MDC Small Game Coordinator Dave Hoover added, "from a burn scheduling impact, considering the overall positive effects for quail, and many other wildlife species, burning will continue to be a critical management practice on public lands. Burn frequency will hopefully be increased on many areas, but burn timing may be more varied." Hoover also noted that, while prescribed fire in the last two years did have a negative effect on quail winter survival, native grassland that was burned and/or grazed had a large positive effect on juvenile survival during summer months. Hoover also said the study noted winter survival was better in areas with "heavy woody cover." More specifically, dense, low growing, woody (shrubby) cover was good, but tall tree edges were bad.

NORTHERN BOBWHITE: JIM RATHER

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1

1 | Tufted  
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2 | Trout lily  
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2



3

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# Up Front

with Sara Parker Pauley

✖ I am still reeling with pride for our Kansas City Chiefs and their spectacular comeback Super Bowl victory. I'll admit, I was concerned early in the fourth quarter, but Patrick Mahomes and his team never gave up. They had trained for this game day, each knew their part in making the dream happen, and they believed and trusted each other and the outcome.

I think of MDC's own versions of game day. This month, it's the trout park opener on March 1. To get to this day, it's taken around-the-clock parenting by our hatchery teams to raise and protect the infant trout as they weather floods and other acts of nature. But they know the goal — to grow healthy fish, ensuring anglers' delight and the making of memories. Our hatchery teams are an amazing example of dedication, passion, and commitment to providing what angling fans desire.

Or what about our MDC teams out collecting data in every season to inform our regulations and management plans? Or the teams battling CWD to ensure successful deer seasons into the future? Or those working tirelessly to develop public programs for our nature centers and shooting ranges? The list of dedicated team efforts throughout the department is an inspiring one.

So, here's to our Chiefs and our MDC teams that inspire us, including making game days possible and worth the wait. Game on!

*Sara Parker Pauley*

**SARA PARKER PAULEY**, DIRECTOR  
[SARA.PAULEY@MDC.MO.GOV](mailto:SARA.PAULEY@MDC.MO.GOV)

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# Nature LAB

by Bonnie Chasteen

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

## RESOURCE SCIENCE

### Neonicotinoids and Wetlands

✳ **Land managers often use neonicotinoids, a new class of insecticides, to control destructive agricultural pests. Neonics, as they are called, are very water soluble. That means stormwater can wash them from a treated site into nearby waterways, potentially affecting complex aquatic food webs.**

“This made us wonder if neonics might be present in Missouri public wetlands, either from direct planting of treated seeds or washing from ag lands into nearby public wetlands,” said MDC Environmental Resource Scientist Doreen Mengel. “If so, what could managers do to reduce neonics in public wetlands?”

From the spring of 2016 to the spring of 2017, Mengel worked with researchers Kyle Kuechle of the University of Missouri and Elisabeth Webb of the U.S. Geological Survey Missouri Cooperative Fish and Wildlife Research Unit. They focused on detecting neonicotinoids in water and sediments in 40 wetlands on 10 MDC conservation areas throughout Missouri.



Migrating waterbirds like Wilson's phalarope stop at public wetlands like Fountain Grove Conservation Area to fuel up on sediment-dwelling insects.

Study investigates neonicotinoids in wetlands and finds steps that can reduce their presence

From these wetlands, they collected samples during four sampling periods over a year.

Analysis of 157 sediment samples showed neonicotinoid compounds in 55–76 percent of the samples, depending on sampling period.

Analysis of 149 water samples showed neonicotinoid compounds in 60 percent of all samples. However, concentrations were lower in the water samples than in sediment samples.

“We were surprised to find the concentrations were so much higher in sediments than in the water samples,” Mengel said.

The team speculated that relatively high sediment concentrations may possibly affect sediment-dwelling invertebrates, which waterbirds eat, especially during migration. As a result, the team identified environmental factors that reduced neonics in wetlands.

## Reducing Neonics in Wetlands at a Glance

**Avoid using neonics in areas subject to leaching or overland flow**



**Limit amount of treated crop-seed to 25% of area**

**When water is >68°F, keep water level >25 cm to help break down neonics**





# In Brief



## PADDLEFISH SEASON BEGINS MARCH 15

GET YOUR PERMIT FOR A CHANCE TO SNAG A MISSOURI MONSTER FISH

➔ Imagine catching a giant, prehistoric fish whose ancestors swam during the time of dinosaurs. That is a reality for thousands of paddlefish snaggers during Missouri's annual spring paddlefish snagging season, which opens March 15.

Paddlefish — named for their large, paddle-shaped snouts — are an ancient species that can grow to 7 feet and weigh more than 100 pounds. The state's major paddlefish snagging waters include Lake of the Ozarks, Truman Lake, and Table Rock Lake. The paddlefish snagging season for these and most other waters in the state runs through April 30. The season for the Mississippi River goes through May 15, with a fall season from Sept. 15 through Dec. 15.

Unless exempt, anglers must have a current fishing permit to snag or operate a boat for snaggers. Once two legal-sized paddlefish are caught, they must be kept by the snagger and included in the daily limit. The daily limit is two paddlefish and snaggers must stop snagging after obtaining the daily limit on Lake of the Ozarks and Truman Lake and their tributaries, and the Osage River below the U.S. Highway 54 bridge.

For more information about paddlefish snagging regulations, snagging reports, and more, visit [short.mdc.mo.gov/ZTC](http://short.mdc.mo.gov/ZTC).



### LANDOWNER VERIFICATION REQUIRED FOR FREE, DISCOUNTED PERMITS

MDC reminds Missouri resident and nonresident landowners who qualify for free or discounted deer and turkey hunting permits to register their properties in the new landowner permit registry, either online or by paper application.

Starting this year, resident landowners with 20 or more contiguous acres and nonresident landowners with 75 or more contiguous acres qualify for landowner deer and turkey permits, but must submit their property information to the registry to receive them.

The new registry will provide MDC and permit vendors with secure records of landowners and members of their households who qualify for free and discounted permits, along with proof of land ownership and boundaries of the properties for which permits apply.

Conservation agents around the state find several hundred violations each year related to the misuse of landowner permits and privileges, and this new system will help eliminate that abuse.

For more information about the MDC landowner permit registry and to register online, visit [mdc.mo.gov/landownerpermits](http://mdc.mo.gov/landownerpermits). To request a paper application and for more information on the registry, email [permits@mdc.mo.gov](mailto:permits@mdc.mo.gov), call MDC Permit Services at 573-522-0107 and select Option 1, or mail a request to: Missouri Department of Conservation, Permit Services — Landowner, PO Box 180, Jefferson City, MO 65102-0180.

## Ask MDC

### Got a Question for Ask MDC?

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or call 573-522-4115, ext. 3848.

#### Q. I discovered an interesting plant in my backyard. Could you identify it?

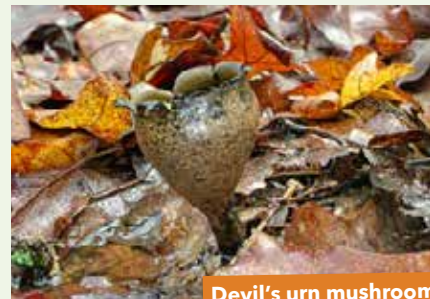
➔ It's not a plant at all; it's a fungus. What is the difference? Plants usually use carbon dioxide, sunlight, and water to create food via photosynthesis, while fungi typically acquire their food by secreting digestive enzymes to absorb dissolved molecules.

Sometimes called a "devil's urn," this urn-shaped, leathery-brown mushroom (*Urnulla craterium*) is one of the first mushrooms to appear in the spring from March to May. They are inedible. But when mature, this species is a good sign that morels are popping. So, if you see one, look around for the more-edible morels.

Devil's urns can be found singly or clustered on small to medium-sized decaying sticks and small logs. When young, they are urn-shaped, but the "mouth" of the urn gets wider as they mature. Older specimens are often shaped more like goblets or cups.

#### Q: I'm interested in catching more crappie. Do you have tips for spring fishing?

➔ Crappie are spawning from March to early June, making it the perfect time to cast a minnow and bobber toward the bank and catch a ton of fish. During the spring spawning period, use a trolling motor to move slowly and quietly close to the shoreline.



Devil's urn mushroom

Most crappie are caught either on a minnow under a bobber or on a small jig — 1/16th ounce being the most versatile. Having two contrasting colors helps make the lure more visible to the fish. They prefer to follow bait moving at a slow, steady pace; they usually don't chase fast-moving prey.

Move slowly and hit every nook and cranny around rocks, woody debris and vegetation. Pea gravel banks are also preferred spawning locations. Once you locate crappie, stop and continue fishing that spot until the fish stop biting or they're not big enough to suit you. If a spring cold front sends crappie out to deeper water, concentrate on steep banks. Crappie won't be very far off the bank.

They are known for being very gentle nibblers. Keep a close watch on the line between the tip of your rod and where it enters the water. It takes patience, but with practice you'll catch on.

For more tips, visit [short.mdc.mo.gov/Zpp](http://short.mdc.mo.gov/Zpp) and [short.mdc.mo.gov/Zmh](http://short.mdc.mo.gov/Zmh).



### Q: Does Missouri have carnivorous plants?

➔ Yes. Missouri is home to four species of bladderwort, the only known fish-catching plant in the world. Capable of eating small aquatic invertebrates and microorganisms, these plants get their name from the small bladder-like traps scattered along their finely divided branches. You can find them floating in still ponds, ditches, and backwaters throughout Missouri.

Bladderworts' pea-shaped traps are tiny at less than a quarter-inch long. On one end is a transparent trap door surrounded by a halo of minute trigger hairs. When closed, the door is sealed watertight. Glands inside the bladder pump water out, emptying the interior and forming a vacuum inside the pocket.

Sugar is secreted as bait to attract small swimming animals, such as tiny crustaceans, insects, tadpoles, and fish fry. The slightest touch of a hair causes the entry to snap shut and the suction causes the victim to be swept inside by the inrushing water. Glands inside the trap emit substances that



Bladderwort

slowly digest the prey, leaving only their skeletons behind.

Bladderworts are far more widespread than other North American carnivorous plants such as Venus flytraps, pitcher plants, and sundews, but are easy to overlook due to their underwater habitat. A telltale sign is their striking springtime flower display. Watch for their bright yellow, snapdragon-like flowers from May to August.



### Jake Strozewski

BENTON COUNTY  
CONSERVATION AGENT

*offers this month's*

## AGENT ADVICE

Paddlefish snagging season opens statewide March 15. This is a finite resource we are fortunate to pursue in Missouri. All snaggers should have the proper fishing permit and know the regulations governing the waters they are visiting. Remember, if you snag a legal-size fish, it must be kept. Anglers must stop snagging once they reach their daily limit of two fish on Lake of the Ozarks and Truman Lake (including their tributaries) and the Osage River below U.S. Highway 54. Finally, paddlefish eggs cannot be possessed or transported outside the body of the fish. For more information on paddlefish and paddlefish season, visit [short.mdc.mo.gov/ZTC](http://short.mdc.mo.gov/ZTC). See you on the water.

## What IS it?

Can you  
guess this  
month's  
natural  
wonder?

*The answer is on  
Page 9.*





# WE ARE CONSERVATION

Spotlight on  
people and partners

by Larry Archer

## Normandy Schools Collaborative

➔ For many urban school students, opportunities to experience nature first-hand are rare, but for seventh and eighth grade students in the St. Louis-area Normandy Schools Collaborative, nature is built into the curriculum.

To facilitate the connection between students and nature, teachers take students on field trips to the Audubon Center at Riverlands, a 3,700-acre nature reserve located near West Alton, Mo., on the banks of the Mississippi River north of its confluence with the Missouri River.

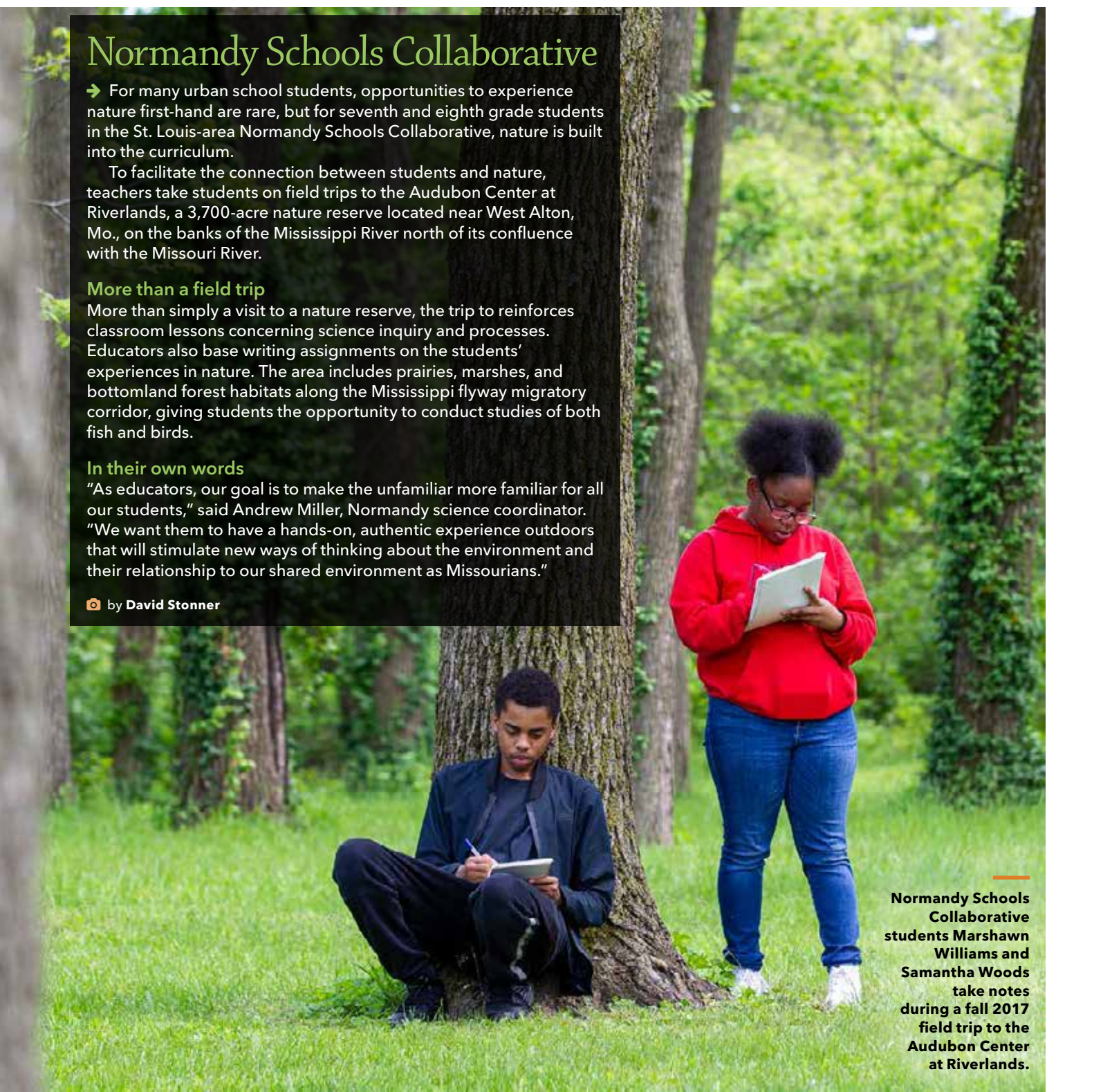
### More than a field trip

More than simply a visit to a nature reserve, the trip to reinforces classroom lessons concerning science inquiry and processes. Educators also base writing assignments on the students' experiences in nature. The area includes prairies, marshes, and bottomland forest habitats along the Mississippi flyway migratory corridor, giving students the opportunity to conduct studies of both fish and birds.

### In their own words

"As educators, our goal is to make the unfamiliar more familiar for all our students," said Andrew Miller, Normandy science coordinator. "We want them to have a hands-on, authentic experience outdoors that will stimulate new ways of thinking about the environment and their relationship to our shared environment as Missourians."

by David Stonner



Normandy Schools Collaborative students Marshawn Williams and Samantha Woods take notes during a fall 2017 field trip to the Audubon Center at Riverlands.

What's **your** conservation superpower?



## BE BEAR AWARE THIS SPRING

Missouri is home to an estimated 540–840 black bears, mostly in the southern part of the state. As spring approaches, these magnificent mammals leave their winter dens in search of food. MDC reminds Missourians to "Be Bear Aware."

MDC Resource Scientist and Furbearer Biologist Laura Conlee said it is imperative that residents remove bear attractants from their property, such as bird feeders, trash, barbecue grills, pet food, and food waste.

"As black bears become active in the spring, they are on a mission to find food," said Conlee. "Letting bears find natural foods is in everyone's best interest. If you see a bear, let the animal be and enjoy the sighting, but be sure to not offer it any food."

Conlee noted that intentionally feeding bears can be dangerous as it makes the bears comfortable around people. It can also lead bears to cause significant damage to property while searching for a meal.

"When bears lose their fear of humans, they could approach people in search of food or may defend the food sources or territory they associate with people, which can make them dangerous," Conlee said. "When this happens, the bear cannot be relocated and has to be destroyed. A fed bear is a dead bear."

Food is usually a bear's main motivator, but that also means it can be a main source of conflict. MDC offers the following tips to avoid attracting black bears to possible food sources:

- ➔ Store garbage, recyclables, and compost inside a secure building or in a bear-proof container until trash pick-up day.
- ➔ Keep grills and smokers clean and store them inside.
- ➔ Don't leave pet food outside. Feed pets a portion at each meal and remove the empty containers.
- ➔ Refrain from using bird feeders in bear country from April through November. If in use, hang them at least 10 feet high and 4 feet away from any structure. Keep in mind that even if a bear cannot get to the birdseed, the scent could still attract it to the area.
- ➔ Use electric fencing to keep bears away from beehives, chicken coops, vegetable gardens, orchards, and other potential food sources.
- ➔ Keep campsites clean and store all food, toiletries, and trash in a secure vehicle or strung high between two trees. Do not keep food or toiletries in a tent, and do not burn or bury garbage or food waste.

While black bears are generally a shy, nonaggressive species and bear attacks are rare, follow these tips when outdoors in bear country:

- ➔ Make noise, such as clapping, singing, or talking loudly while hiking to prevent surprising a bear.
- ➔ Travel in a group if possible.
- ➔ Keep dogs leashed.
- ➔ Be aware of the surroundings. If there is evidence of a bear, such as tracks or scat, avoid the area.
- ➔ Leave bears alone! Do not approach them, and make sure they have an escape route.

For more information on Missouri black bears and how to Be Bear Aware, visit [mdc.mo.gov/bearaware](http://mdc.mo.gov/bearaware). Learn about MDC's Missouri Black Bear Project at [short.mdc.mo.gov/ZTb](http://short.mdc.mo.gov/ZTb).



Report bear sightings and post photos online at [mdc.mo.gov/reportbears](http://mdc.mo.gov/reportbears).

## WHAT IS IT? BLOODROOT

A sure sign of spring, bloodroot begins blooming in March. Look for these solitary white flowers, which grow to 1¼ inches across, along wooded slopes. The stark white blooms are a significant contrast to the plant's namesake bright red sap. Bloodroot is a perennial wildflower that grows in colonies. Though the blooming stage lasts a short time — March through April — and each flower only lasts about one to two days, the bloodroot's large scalloped leaf is quite distinctive and grows through midsummer.







Devil crayfish



# Burrowing Crayfish

THESE ELUSIVE ENGINEERS CONTRIBUTE GREATLY TO THEIR HABITATS

by Isabeau Dasho and Bob DiStefano

If you've ever put your toes in the water of a Missouri stream on a hot summer's day, chances are you've seen a crayfish scuttle by — maybe to the safety of a big rock or a fallen log or simply looking for something to eat. Missouri watersheds are full of different kinds of fresh water crustaceans. Most crayfish species can be found in plain sight, zooming around your toes in a stream or pond on a sunny afternoon. But a small group of crayfish are shy, carving out a more private and solitary life in places where we might not expect, like out of the water.





## The 'Burrowers'

Nature is funny in that some of the more important species can be hard to locate, don't conform to normal patterns, and are often overlooked or not given enough credit. Burrowing crayfish are one such species group. These "burrowers" spend most of their lives on land, or rather, burrowed into the land. Because they live under the radar and are not often observed, we were slow to notice and learn about them. Only recently have detective-like scientists started to measure and understand the contributions of these particularly secretive burrowers to our ecosystems.

First, why and how would crayfish — who have gills — want to be out of the water at all?

These burrowing crayfish are called "ecosystem engineers." Like beavers, who modify and build habitats to better suit their needs, crayfish modify their surrounding environment, create a specialized role for themselves, and often provide habitat for other animals and plants. Burrowers often excavate and inhabit tunnels (burrows) near surface water like streams, ponds,

marshes, and even human-made ditches. They dig down into the soil until they reach the water table and use underground water for moisture and breathing.

While these burrowing crayfish spend most of their lifecycle in the burrows they build, they do venture forth seasonally to forage and find mates.

Missouri has seven known species of burrowing crayfish, and these incredible adaptive crustaceans occur in every part of our state. The problem for these special mudbugs is that as we are learning about them, we are also learning that some of them are species of conservation concern. A species of concern is one that may need more concentrated conservation attention to help it thrive.

## Good Neighbors

Crayfish are called "keystone" organisms because their presence greatly benefits the health and stability of the ecosystem they inhabit. Crayfish are a vital food source to many creatures. Over 208 other species, including birds, fish, amphibians,

### Stealth Hunters

Many species of burrowing crayfish emerge from their burrows only during wet seasons. They might search for a mate or forage on nearby plant matter. Others will hunt for a meal by sitting just outside of their burrow entrance, hoping to ambush unsuspecting prey that might walk by.

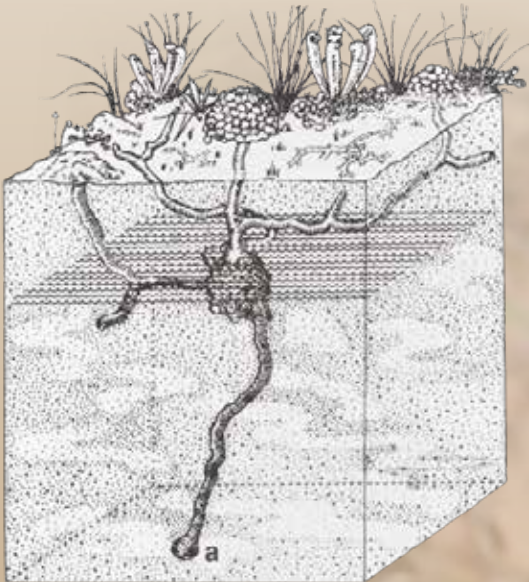
Painted devil crayfish



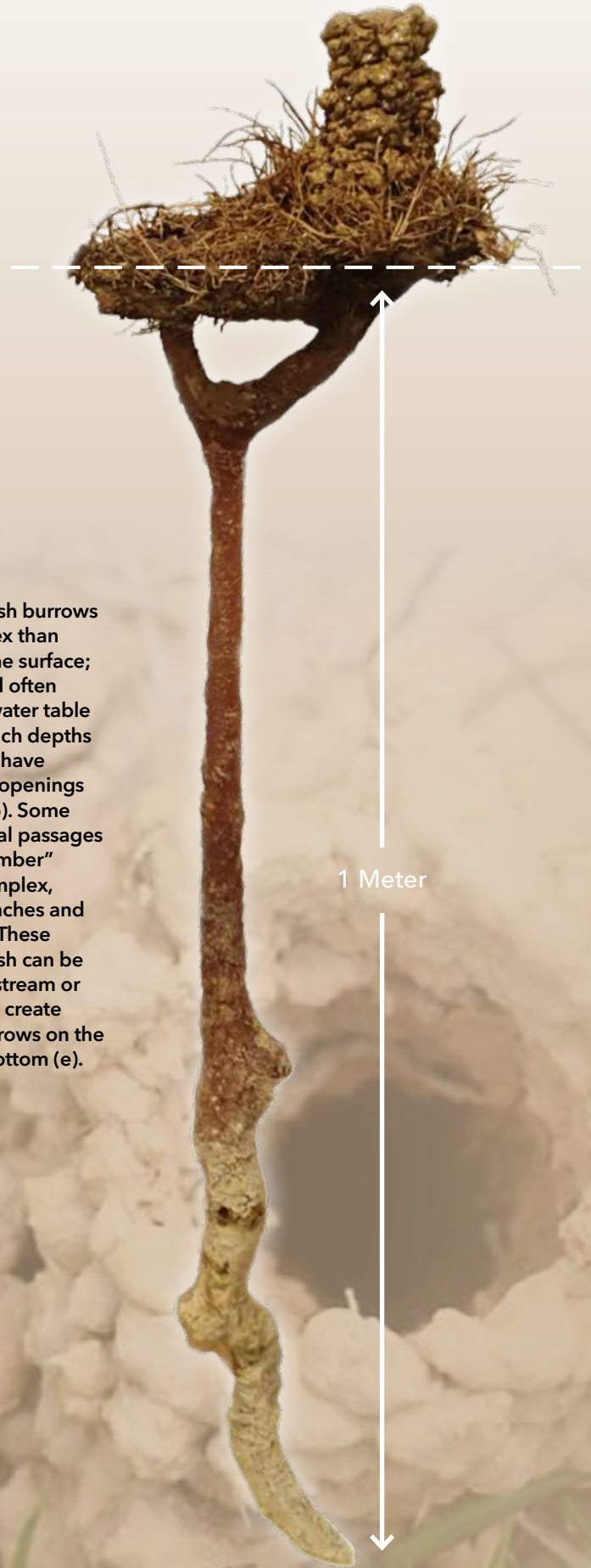
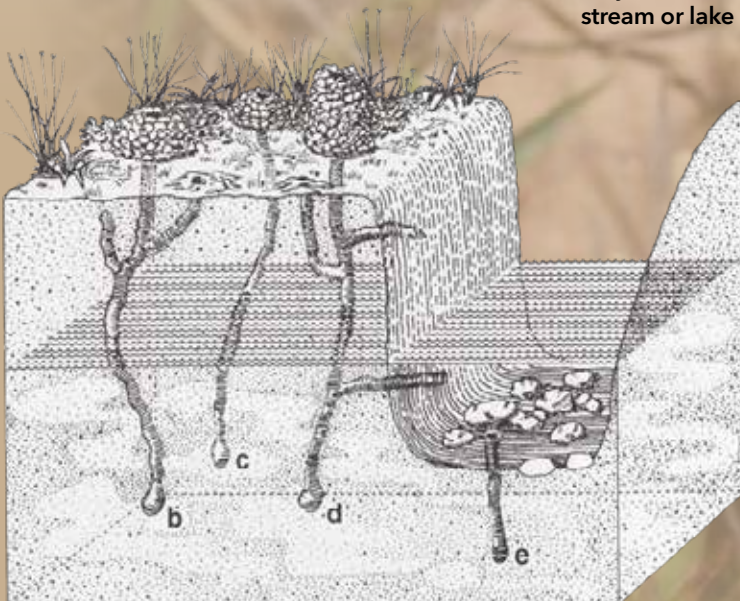


## Crayfish Chimneys

Burrowing crayfish often build "chimneys," made of excavated soil at their burrow entrances. Chimneys can act as passive ventilation structures, where fresh air is drawn down into the burrow from an entrance with a lower chimney and exits through a second entrance with a taller chimney. This is like prairie dogs who build their burrows with one entrance located higher than the other for ventilation. Experiments suggest that chimneys release chemical cues that attract juvenile burrowers to burrows made by adults of the same species rather than to those of other species or chimneys made by human hands.



Burrowing crayfish burrows are more complex than they appear at the surface; extending to and often well below the water table (a). They may reach depths to 15 feet. Many have multiple surface openings or chimneys (a, b). Some are simple vertical passages ending in a "chamber" (c). Many are complex, with several branches and chambers (a, d). These burrowing crayfish can be contrasted with stream or lake crayfish that create only shallow burrows on the stream or lake bottom (e).







Digger crayfish



Ditch fencing crayfish



Vernal crayfish

The digger crayfish, ditch fencing crayfish, and vernal crayfish are three of Missouri's seven known burrowing crayfish species. Burrowing crayfish differ from most of Missouri's crayfishes that reside year-round in waterbodies. These three species spend most of their lives in burrows excavated in the soils of the Ozarks and Mississippi River Lowlands.

reptiles, and even mammals, eat crayfish. Missouri prairie dwellers, such as the federally threatened and state endangered eastern massasauga rattlesnake and Graham's crayfish snake, prey on burrowing crayfish. Catfish, Missouri's most popular river sport fish, also eat crayfish. In fact, one study found that crayfish made up almost half of the channel catfish's diet in the Yockanookany River in Mississippi, and most of those appeared to be burrowing crayfish. They also provide meals for Missouri wetland occupants, such as ducks and wading bird species like herons and rails.

Like all crayfish, burrowing crayfish decompose dead and decaying organic matter into finer materials that can be eaten by other organisms in their community, thereby upcycling nutrients back into their ecosystems.

In addition, the burrowing crayfish's burrow provides habitat for several species of snakes, frogs, toads, amphipods and isopods, nematodes, spiders, insects, and mammals. Several

snakes even hibernate in these burrows. Crayfish burrows provide a nice place to rest or hide, but during drought they can be a lifesaving refuge for salamanders and dragonflies, including the endangered Hines emerald dragonfly.

### Integral to the Community

Burrowing crayfish also provide services that more directly benefit their human neighbors. Their excavation projects improve plant life in Missouri's grasslands (including prairies) and river and wetland floodplains. One study showed that Missouri's prairie crayfish burrow to depths greater than 3 feet, while other species' burrows extend to 15 feet. This deep digging improves subsurface waterflow and soil structure by mixing and moving nutrients closer to the surface where they can be used by many plant species. Better soil means better farming, and more diverse plant communities with strong root systems means less erosion, which has many positive effects for humans.



And with their enhancement of subsurface waterflow, our burrowing neighbors have created natural irrigation systems that operate both horizontally and vertically. That's right, they don't just dig straight down. While some burrowers dig relatively modest burrows, with a single tunnel and chamber about 1 foot from the soil surface, other burrowers are skilled architects that build many tunnels and chambers down to 15 feet below the soil surface. Most burrowers also design and build their chimneys to better regulate air flow and water in their subterranean homes, not unlike humans. One burrowing crayfish species that was studied brought over 7 tons of soil per acre per year to the surface, mixing the entire soil surface in a three-year period.

That's a lot of digging for a creature that can fit in a can of soda or a garden trowel. And a lot of work that farmers and land managers don't have to put into the land to make it productive for crops, grasses, or cattle.

### Finding the Crayfish

If these crayfish are so hard working and so important, how did we miss them for so many years? As mentioned earlier, burrowing crayfish don't simply dig straight down, they create a vast network of burrowing tunnels underneath the soil surface, so that in the past, surveys often underestimated the number of crayfish or missed them entirely. These are a very elusive and secretive crayfish who don't emerge from their burrows very often. Consequently, up until recently, we've underestimated the significant contributions of these burrowers to our ecosystems.

But even when we rarely observe a species, we can often see the effects of its greater presence in the ecosystem. In this way, MDC biologists who study such habitats (wetlands, prairies, floodplains) worked a little backwards — toward the burrowing crayfish — like seeing a shadow and not the person. MDC biologists could see this ecosystem shadow of the burrowing crayfish and wanted to know more. Even as burrowing crayfish remained very secretive and elusive to the scientists, their ecosystem services became increasingly evident and impossible to dismiss. Crayfish burrows have been shown to expedite subsurface movement of water through otherwise poorly drained soils at rates greater than could be attributed to any other burrowing organism. So, while these engineers were hard for scientists to find and quantify, their contributions could not be ignored.

Species	Range in Missouri
Devil Crayfish	Statewide
Digger Crayfish	Mississippi Lowlands, Ozarks
Ditch Fencing Crayfish	Mississippi Lowlands, Ozarks
Painted Devil Crayfish	Mississippi Lowlands
Paintedhand Mudbug	Mississippi Lowlands*
Prairie Crayfish	Northern Prairies
Vernal Crayfish	Mississippi Lowlands, Ozarks
*Probably occurs in other regions.	

*Most U.S. states, including Missouri, are experiencing serious problems with invasive crayfish that reduce or eliminate native species, alter habitats and food chains, and harm sport fisheries. Please do not release live crayfish (bait, pets, etc.) into Missouri waters because such live release is illegal and is the major cause of these invasions.*

### Crayfish Study

This lack of knowledge surrounding burrowers ends this year with MDC's first-ever research study dedicated specifically to them. MDC biologists and our partners at the University of Illinois will survey a portion of southern Missouri for crayfish, so we can get a more accurate picture of the species and their population distributions. Since this study was requested by wildlife managers who wish to learn which land management practices promote burrowing crayfish populations, we will also investigate the effects of some specific practices, such as controlled burning or water-level management. The more MDC biologists learn about these highly secretive species, the better we can fully understand their role in our ecosystems and how to conserve and manage them for future generations.

To protect and manage the burrowing crayfish, we must answer questions about their lifecycle, their habitat, and range. What soil densities and varieties do they prefer? What kind of water bodies, water levels, and plant communities best suit them? How do wildfires and controlled burns affect the presence of burrowing crayfish? Scientists have only scratched the surface of what we need to know regarding this mudbug — but soon these and many other questions can begin to be answered.

It's exciting to meet an old new neighbor, and to know that new discoveries are waiting in our own backyard. MDC biologists are ready to help us understand these burrowers, their unique and secretive lifestyle, and all they do for us and other creatures. Science is always expanding our knowledge of the natural world. But it is especially wonderful when research can shine a light on a little-known and unsung habitat hero. ▲

*Isabeau Dasho lives and writes in Chicago, IL. She is on the faculty of Harold Washington City College where she teaches English through the lens of conservation. Bob DiStefano has worked at MDC as a fisheries research biologist and resource scientist for 33 years. Most of his time over the past 25 years has been spent researching, managing, and conserving Missouri's diverse crayfish resources.*





# LEOPOLD'S TOOLBOX

CENTURY-OLD LAND MANAGEMENT TECHNIQUES  
STILL WORK FOR ATTRACTING WILDLIFE

by Scott Sudkamp

**F**lip through any outdoors magazine or tune in to your favorite hunting show and you'll quickly realize that there's no shortage of ways to spend your money on habitat improvement. This might lead many to believe the only way to attract and hold strutting toms and big bucks is to spend big bucks, but that is not the only way to improve habitat for wildlife.

While most ads for food plot mixes or habitat management implements suggest that these tools are crucial to success, there are many ways to improve your land to provide the cover and food that wildlife needs.

If food plot mixes, specialized equipment, and big budget habitat enhancements are beyond your financial comfort

level, take heart. Commercial food plot blends may attract wildlife, but native forbs, seeds, fruits, and woody browse are just as likely to do the trick. And the beauty of this approach is that often you do not need to purchase a single seed — just create the proper conditions for native species to flourish and then let them fill in and do their thing.







## The Land Management Toolbox

Decades ago, before any of these big budget items were even concepts, conservationist pioneer Aldo Leopold recognized that there were basic tools and techniques for improving habitat for wildlife. In his seminal work *Game Management*, Leopold penned,

**"The central thesis of game management is this: game [wildlife] can be restored by the creative use of the same tools which have heretofore destroyed it — axe, plow, cow, fire and gun."**

At a time when many wildlife populations were at an all-time low, he recognized that a tool used inappropriately is dangerous, while that same tool, used properly, can be beneficial. These tools identified nearly 100 years ago still form the core of our habitat management toolbox today.

To understand how we can benefit the land and its native flora and fauna, let's unpack the toolbox and take a closer look at each tool and its proper use.



Aldo Leopold



### AXE

The axe represents our ability to modify habitat by removing or altering woody vegetation. Using the axe and its surrogates (chainsaw, brush cutter, forestry mulcher), we can modify habitats to favor the growth of early successional vegetation (See *Early Successional Vegetation*, Page 20), increase browse, promote forest health, and remove invasive species. Habitat management techniques related to the axe include timber stand improvement (TSI), edge feathering, and planned forest harvest.



### PLOW

The plow relates to the use of implements to shift plant communities from advanced stage, perennial-dominated systems to younger communities with more annual plant species. It is most often used in herbaceous communities and is usually carried out with the use of a disk, rototiller, harrow, or plow, but could also include the use of a bulldozer and other equipment. Habitat managers recommend early successional vegetation for wildlife such as northern bobwhites, white-tailed deer, dabbling ducks, and turkey. The plow and its variants can be an important tool for promoting the plant communities these species favor.



### COW

Applied incorrectly, grazing, as represented by the cow, can result in the elimination of cover, erosion, nutrient overload, and loss of diversity. But make no mistake, when used properly, grazing can be a powerful habitat management ally. Many of Missouri's ecosystems evolved in the presence of bison, elk, and other ungulates. Today many of our historic grazers have been replaced with the cow. And while bovine behavior may be somewhat different from the grazers of centuries past, the overall effects can still be positive as properly applied grazing can alter plant dominance, reduce thatch build up, cycle nutrients, and sculpt vegetative structure.





Good management results in habitat with improved species diversity and structural diversity. Bushwhacker Lake Conservation Area, Vernon County



## FIRE

No other tool at our disposal has the potential to be as cost effective and costly at the same time as fire. It played an integral role in the development of Missouri's prairies, glades, woodlands, and savannas, and its use by Native Americans and early pioneers resulted in plant communities that were diverse, robust, and attractive to scores of wildlife species. Fire removes thatch, resets the successional calendar, attracts herbivores to the fresh regrowth, and sets back certain species while enhancing others. Savvy managers know that fire can be the cheapest management tool, but also can be dangerous and very expensive if not done properly. Do not attempt to use this tool unless you've received training in its application and have plenty of help.



## GUN

In Leopold's day, unregulated market hunting caused the extinction of some species and threatened the fate of others. Thanks to game laws that set seasons and limits on what hunters could harvest, as well as wildlife science that continuously refines and informs management decisions, today we enjoy robust populations of several game species. In fact, in parts of Missouri, especially near urban areas, an overabundance of some species such as white-tailed deer and Canada geese may negatively affect habitats. In these cases, more harvest may be necessary to slow population growth and balance the herd with the habitat.



## HERBICIDE

There is one tool commonly used today that Leopold did not mention by name. At the time of his writing, herbicides were still several years from popular use, but had they been more available, he likely would have included them in his list. As with all the other tools we've covered, herbicides can have positive or negative effects, depending on their application and use. Habitat managers should always read, understand, and follow the label for application rates and techniques. Herbicide chemistry and technology offer great potential for succession management and invasive species control, if they are used properly.



## Early Successional Vegetation

Succession is the change in a plant community over time. Think about what would happen to a field if you were to till it up and then leave it alone for 20 years. In the first year, you would see lots of annual plants — those that grow, flower, and die in a single growing season. The next year you would still have some annuals, but also some perennials. By the fifth year you would likely have some woody plants such as blackberry, as well as young trees starting to show up. By year 10 without disturbance, you might see a young forest or a community dominated by perennial grasses such as tall fescue, and so on. At each stage, the plant community will be different in terms of the food and cover available to wildlife. In late successional stages, plant diversity may be low, and most browse may be out of reach of many wildlife species (e.g., at the top of a tree). By contrast, early successional communities are typically rich in species diversity, with several dozen plant species providing an array of food, cover, and structure. Due to the nature of annual plants' life cycles, they must produce lots of seeds to ensure their species' survival and the perpetuation of their genetic material. Because of the diversity of species and their propensity for seed production, early successional communities are preferred by many popular wildlife species such as bobwhites, turkey, deer, rabbits, and doves.



DEER: NOPPADOL PHOTHONG; LANDOWNER ASSISTANCE: DAVID STONNER



## Diversity Brings Success

Managing habitats this way also provides a diversity of plants to meet the dietary and cover needs of wildlife. With single-species commercial mixes, poor growing conditions (e.g., drought, flooding) may leave you with little or no production. But using an approach built on promoting diversity provides built-in insurance against failure. In a community with many plant species, there will always be species that produce, regardless of the weather.

In addition, native species are well adapted to the soils on your farm, meaning they will often thrive even if conditions are not ideal. So, you can save money on fertilizer and lime and invest those funds elsewhere for other improvements. And last, but certainly not least, many nontarget wildlife species (e.g., pollinators) may also benefit more from a diverse plant community versus a low-diversity planting. Native pollinators have received a lot of press lately, and rightly so, for they provide ecological services of inestimable worth. Using these tools, alone or in combination, we can transform our lands into productive oases for numerous species. A diverse native plant mix has additional benefits:

**Time efficiency.** This approach works well for landowners who may live several hours from their farm. Rather than fret over the need for multiple trips and perfect weather, managers can go in and do the work to set the stage for growth of the native species. After that, there's no need to worry about it anymore, as nature will do the rest. This approach saves time versus having to make multiple trips to work ground, plant, fertilize, spray, etc.

**Cost effectiveness.** Instead of investing hundreds or thousands of dollars in high cost seed, fertilizer, and implements, you can instead invest a few bucks in fuel for a tractor or ATV to encourage natural regeneration and early succession vegetation. Or plan and execute a prescribed burn to realize a beneficial shift in the plant communities on your farm.

**Improved land stewardship.** You'll become more in-tune with your farm and the dozens of plants and animals that respond and result from your efforts. And this approach encourages you to learn to identify native plants and their growth habits, as well as better understand species' responses to habitat management.

**Forgiveness.** No matter what you do, some variety of plants, and their associated wildlife, will respond to your treatment. Burn too hot, too early, too late,



## Getting Help with Your Habitat Management Needs

Missourians have plenty of options when it comes to getting help with their conservation projects. Whether your needs entail cost share, technical advice, species identification, or engineering, chances are free help is available. More information on property management is available online at [mdc.mo.gov/property/improve-my-property](https://mdc.mo.gov/property/improve-my-property). To find a private lands conservationist near you, go to [short.mdc.mo.gov/ZQ5](https://short.mdc.mo.gov/ZQ5) or contact your local regional office online at [short.mdc.mo.gov/ZoF](https://short.mdc.mo.gov/ZoF).

or disk too deep, etc., and nature will fill the void you've created with multiple species adapted to those conditions.

## Surprising Results

In 2012, I converted about 20 acres of fescue pasture on my farm to native grasses and forbs. In addition to the bluestems and native forbs that began growing that year, I created an ideal growing situation for redroot amaranth. Despite the severe drought that year, in the absence of sodgrass competition, one plant grew to a robust 5 feet tall, with a stem as thick as a broom handle. This plant was readily evident from even several hundred yards away and continued to attain impressive proportions until early fall, when I noticed it was no longer standing tall in the field. I found that some deer had finally decided to investigate its palatability and within a few days had completely stripped it of its leaves and the tips of the shoots, thus reducing it to a single sorry-looking stem. This illustrates how a plant many think of as a weed may be an important food or cover source for the wildlife on our lands.

Whether your habitat management aspirations are limited by cash or time or both, there's still a lot you can do to improve habitat and foster the wildlife on your land. This year why not unpack your manager's toolbox and try a few of these techniques, alone or in combination, and see for yourself what they can do. The results may surprise you. ▲

*Scott Sudkamp worked as a wildlife biologist for 20 years in Missouri and Texas. He resides in Vernon County and enjoys hunting and using Leopold's tools to enhance the wildlife habitat on his farm.*





# A River Ran

When early explorers made their way across what would be southeastern Missouri, they saw a seemingly endless expanse of bottomland hardwood timber with interconnecting sloughs and oxbows. Otter Slough Conservation Area is reminiscent of that time. The 4,866-acre area is managed primarily for migratory and wintering waterfowl, but many wading birds, shorebirds, eagles, and wetland mammals make the area their home.





# Through It

HOW THE MIGHTY MISSISSIPPI INFLUENCED  
MISSOURI'S MOST DIVERSE REGION

by Candice Davis | photographs by David Stonner

*No matter where you look*

in Missouri's Bootheel, the mighty Mississippi River has left its mark. The river's influence on the landscape of Missouri's southeast region is even more significant when one realizes the area used to be an ocean, said MDC Systems Ecologist Molly Sobotka.

"Since then, the Mississippi has at various times flowed over and through much of the flatlands of the Bootheel, which means most of the soil was deposited here by the river," she said.





Trees such as bald cypress, water tupelo, and cottonwoods grow along the river and can be massive due to the influx of water in the region.



At one time, the river flowed through 1.65 million acres of the area, creating a massive swamp. It pushed sediment across the land, creating natural hills in the floodplain and large areas of sandy ground. The history of the river's influence on the Bootheel is what has created the diverse plants and habitat found there. Now, levees protect many of those areas, creating spaces for agriculture and cities, but the remaining wetlands across the Bootheel are still regulated by the flood cycle. Floods flush water, nutrients, sediment, and all kinds of insects and macroinvertebrates into the wetlands.

Fish spawn during floods, and their eggs and offspring often end up in flooded areas where they take advantage of the growing plankton and invertebrates for food. A rich diversity of young fish thrive in the shallow flooded spaces.

These larval stage crappie, bluegill, alligator gar, buffalo, gizzard shad, and other native species use the flooded spaces. The vegetation slows the water and provides places to hide from predators.

"When they're larger, they'll move into the deeper spaces of the river," Sobotka said.

Above the water, eagles and herons feast year-round on the abundance of fish. The river also acts as a major migratory flyway for songbirds and waterfowl throughout the spring and fall. These birds rely on the river's offerings, including seeds and fruits from riparian plants and an abundance of semiaquatic invertebrates like mayflies, to fuel their trips.

"In spring or summer, you can whack a tree branch and send mayflies swarming, then they'll kind of settle back down to the branch," Sobotka said. "The mayflies are a great source of protein for birds migrating along the river."

While not found in the main channel of the river, amphibians seek safe-haven in adjacent floodplain wetlands and lakes. Five of Missouri's 12 salamander species thrive in the Bootheel. The western lesser siren lives in the sluggish ditches, sloughs, and swamps. By day, it hides under submerged plants, and then forages at night for crayfish, aquatic insects, and worms.

The river has influenced the spread of plants, as well, dispersing seeds across the region. Trees that "like to have their feet wet" do well in the riparian corridor of the mighty river, Sobotka said.

"We have some very cool, flood-adapted species — like bald cypress, water tupelo, and cottonwood trees — that grow along the river and can be massive," she said.



## *Bottomland Hardwood Forests*

Imagine thick stands of some of the oldest trees in the state. The soil is rich and the trees are accustomed to surviving seasons of continually wet, flooded ground. The canopy is filled with pin oak, bur oak, swamp white oak, sycamore, cypress, and tupelo that darken the light beneath. These old trees can reach more than 100 feet high and 2 feet in diameter.

“One of the richest habitats in these low areas are the bottomland hardwood forests,” said MDC Resource Forester Ross Glenn.

“These are remnants of what the entire region once was, when it was more than 90 percent covered in these forests, with sandy prairies, bottomland lakes, sloughs, and marshes interspersed within the forest,” Glenn said.

The understory is relatively open, with woody vines and shrubs like spicebush, pawpaw, and buckeye. Cavities in the large, aged trees provide shelter for wildlife, including the region’s rare swamp rabbit, which uses snags and downed logs throughout the forest.

Less than 10 percent of the Bootheel lowlands have forest cover. Looking at what southeast Missouri once was helps to understand what is today, Glenn said. The sections of major habitat types — the St. Francis Floodplain, Little River Basin, Mississippi River Meander Belt, and elevated sandy ridges like Malden Ridge, Sikeston Ridge, and Sand Plains — should all be considered when examining the Bootheel’s bottomland forests, he said.

Trees in the St. Francis Floodplain include sweetgum, cypress, elm, water tupelo, and a variety of oak species on slightly higher elevations. The Little River Basin is a long broad clay-filled area that extends down through the center of the lowlands, flanked by sandy ridges and once dominated

by swamps, backwater sloughs, bottomland forest, and open water marshes. Sweetgum, ash, elm, maple, and a variety of oak trees are found there.

The Mississippi River Meander Belt is where the Mississippi River carved through the land over the last several hundred years. Elm, cottonwood, sweetgum, ash, and cypress trees thrive there.

The elevated sandy ridges of Malden Ridge, Sikeston Ridge, and Sand Plains rarely flood and the sandy soils play a major role in which plants survive. Forests in these higher areas look like the upland areas of the state, filled with sweetgum, oaks, elm, hickory, and dogwoods.

## *Sandy Prairies*

Southeast Missouri conjures thoughts of swamps and bottomland hardwoods, but not necessarily prairie habitats. However, slight variations of elevations and the right soil make a completely different Bootheel habitat — the sand prairie.

Sand prairie is rare in Missouri. The 200-acre Sand Prairie Conservation Area (CA) in Scott County is one of the last remnants of sand-filled land. At 330–340 feet above sea level, it is one of the lowest spots in the state, but in the Bootheel, it’s one of the more “upland” areas. Sand prairies were created by the Mississippi and Ohio rivers, Sobotka said.

“As the rivers flooded, they pushed sediment out of their banks and into natural hills in the floodplain, creating large areas of sandy deposition,” she said. Due to the harsh, dry conditions and low soil fertility, few trees thrive in the sand prairies, according to Natural History Biologist Kevin Brunke, manager of Sand Prairie CA. However, in some places, sand prairies give way to sand savannahs and dry sand woodlands, where post oak, black jack oak, black hickory, and mockernut



At 330 to 340 feet above sea level, Sand Prairie Conservation Area is one of the lowest spots in the state, yet one of the more “upland” areas of the Bootheel.



hickory dominate. Some species, like sand hickory, are only found in these sandy, sparsely forested habitats.

“Plants that thrive in sand prairies must endure the harsh conditions provided by easily eroded soils that are dry for much of the year,” Brunke said. “When you go to the sand prairie, it doesn’t look like a typical Missouri landscape. You’ll see split beard bluestem, tickseed coreopsis, eastern prickly pear, snout bean, dotted beebalm, and plains puccoon. These plants are up for the challenge of the less fertile soil.”

The prickly pear, typically thought of as belonging in deserts of the western U.S., thrives in the sand prairie. Plants like dotted beebalm and snout bean are restricted to these sandy habitats, causing them to be species of conservation concern.

Like sand-selective plants, wildlife in a sand prairie thrive for specific reasons. Many grassland birds, like eastern meadowlarks, dickcissels, northern harriers, and northern bobwhites use sand prairies, as do some species of conservation concern, like dusty hog-nose snakes, Illinois chorus frogs, and northern scarlet snakes. On warm spring nights, Illinois chorus frogs can be heard near wet swales in an otherwise sandy landscape.

MDC uses prescribed fire to help maintain the area’s biodiversity, Brunke said. Fire allows certain species to flourish

while setting back other species that creep in where they don’t belong.

“Without fire, trees would also encroach on the prairies in some places, shading out many of the sun-loving species of native grasses and wildflowers,” he said. Just months after a prescribed fire, the native wildflowers and grasses on the area emerge lush and thicker than before. Managers also collect seeds from plants on the area for restoration efforts elsewhere.

Sand Prairie CA is one of the few remaining public sand prairie habitats. Many historical sand prairies are now being farmed. Center pivot irrigation systems allow successful farming of the sandy soils, while leaving the nonirrigated corners of fields available for prairie restoration. Game species like eastern cottontails and northern bobwhites can use these corners, forming an important partnership between farming and conservation, Brunke said. Also, the plant diversity in these dry, sandy corners provides excellent habitat for pollinators.

## *Wetlands*

Each spring and fall, snow geese tornados — flocks of hundreds of thousands of snow geese — descend on the region’s wetlands to take advantage of the smorgasbord of marsh plants.

The Missouri Bootheel was once an expansive swampland, consisting of 1.65 million acres of bottomland forests and herbaceous swamp, said MDC Wetlands Ecologist Frank Nelson. The remaining tracts of wetland habitat — nearly 84,000 acres — span several MDC conservation areas, Big Oak Tree State Park, and Mingo National Wildlife Refuge, as well as private land enrolled in the Wetland Reserve Easement Program.

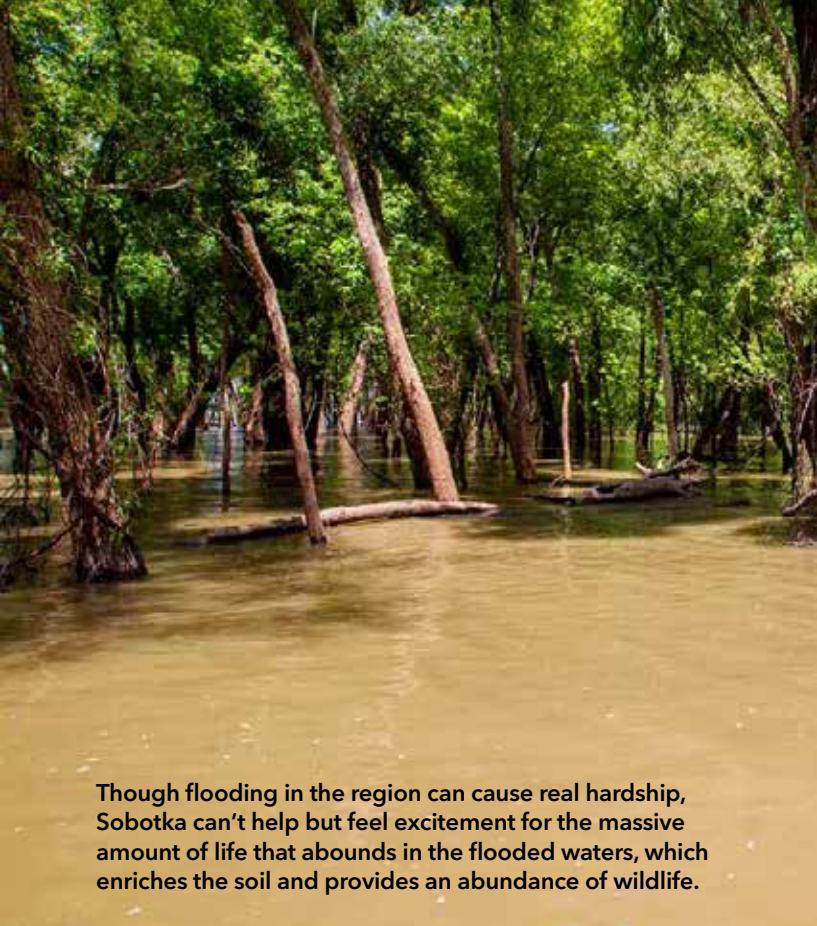
These wetlands are magnets for outdoor activities.



Heron and egret nesting areas are called rookeries and consist of a dense forest of trees with limbs that touch. Adults bring fish back to the chicks in the nest who will walk around the tree tops before they learn to fly to their daily fishing spots.







Though flooding in the region can cause real hardship, Sobotka can't help but feel excitement for the massive amount of life that abounds in the flooded waters, which enriches the soil and provides an abundance of wildlife.

"Whether it's hunting, fishing, birdwatching, or just enjoying the sights and sounds, there is always something to experience in a wetland, and it is likely going to be different from your last outing," Nelson said.

Missouri's wetlands are hotspots of natural diversity and top the list of locations with the most documented bird species, which reflects the diversity of other species as well.

Wild game, including deer and turkey, take advantage of the wetlands' abundant food, cover, and water. Twice a year, songbirds, shorebirds, waders, waterfowl, rails, and others migrate to and through Missouri's wetlands, stopping to rest and refuel for the next leg of their seasonal journey. During the summer months, a variety of songbirds, ducks, marsh birds, and wading birds use Missouri's rivers, sloughs, and marshes to breed and raise their young.

"Below the water and under the leaf litter there are smaller, more cryptic creatures that also rely on these wet-dry habitats," Nelson said. "Salamanders, frogs, snakes, and turtles rest and reproduce using a mosaic of wet and dry habitats in close juxtaposition."

Periodically, through wet cycles, fish move into other wetland habitats and take advantage of the flooded bugs and leafy cover for food and refuge before moving back into adjacent rivers and streams. At an even more discrete and hard to discern scale, the base of the food chain is anchored by a host of terrestrial and aquatic invertebrates that move the ecological gears of decomposition and pollination.

"At the end of the day, these dynamic locations are a dizzying array of diversity, which is truly special," Nelson said.



### *A River Still Runs Through It*

Southeast Missouri's rich legacy of habitat and wildlife diversity has changed over time. Despite levees and channels that drain excess water away from roads and fields, the mighty Mississippi River continues to influence the region.

"It's a love-hate relationship with the flooding," Sobotka said. "On one hand, the flooding does cause real hardship to us in so many ways. On the other, as I look out across all that mass of water, I can't deny a little excitement for the equally massive amount of life that is abounding underneath."

That life, in the form of fish, plant, and amphibian species crossing what would normally be a hard boundary, as well as nutrients spreading throughout the area, will trickle into richer soil and an even greater abundance of wildlife to enjoy. ▲

*Candice Davis grew up in Southeast Missouri. She has enjoyed 12 years of working for MDC as a media specialist. She enjoys being close to Missouri's rivers and wetlands.*



# Get Outside

in MARCH

→ Ways to connect with nature



## Flying Squirrel

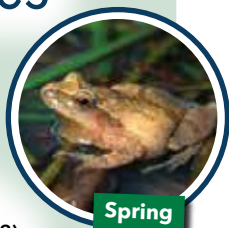
Flying squirrels are fairly common throughout Missouri, but because they only come out at night, they are hard to see. To catch a glimpse of these furry gliders, place a bird feeder filled with seed on a tree so that the light from your porch will reach it. After dark, wait quietly by the window and listen carefully. When you hear a soft whump or some musical squeaks, flip on the light to reveal your visitor.

ST. LOUIS REGION

## Hiking: Timberdoodles and Spring Peepers



American woodcock



Spring peeper

Saturday, March 14 • 6-9:30 p.m.  
(Registration required by March 13)  
OR

Saturday, March 21 • 6-9:30 p.m.  
(Registration required by March 20)  
August A. Busch Memorial Conservation Area  
2360 Highway D, St. Charles, MO 63304  
Registration required. Call 888-283-0364 or register online at [short.mdc.mo.gov/ZmN](http://short.mdc.mo.gov/ZmN) for the March 14 event and [short.mdc.mo.gov/Zmx](http://short.mdc.mo.gov/Zmx) for the March 21 event.

All ages

Witness a "nature show" that belongs to one of the strangest members of the bird world, the woodcock, also known as timberdoodle. Also look and listen for one of the loudest singers of the amphibian world, the spring peeper. Includes a 1½-mile hike.

## Welcome Home

**Purple martins** return to Missouri from their winter getaways in South America. These birds depend almost entirely on the nest boxes humans provide, so it's time to raise those purple martin houses.



### Natural Events to See This Month

Here's what's going on in the natural world.



Pawpaws begin blooming



Muskies begin spawning



Ticks appear



## Babies on Board

**Bald eagle chicks** begin hatching in March. If you've been watching an eagle's nest, grab your binoculars and see if there's a new addition to the brood. Keep a respectful distance from the nest and try not to disturb the occupants.



## Protect Pollinators

Why do today what you can put off until tomorrow? This might sound odd, but it is sound advice when protecting pollinators. Like other wildlife, pollinators need cover and food. Much of what you would do for ground-nesting birds and small game would also benefit pollinators. In fact, you may already have pollinator habitat and not even realize it. To protect dormant pollinators, delay spring yard cleanup until mid-April.



### SOUTHWEST REGION

## All About Snakes

Saturday, March 28 • 10 a.m.-noon  
Shepherd of the Hills Conservation Center  
483 Hatchery Road, Branson, MO 65616

No registration required. Call 417-334-4865 for more information.  
All ages

What is that noise in the leaves? Could it be a snake? Learn why snakes make great neighbors. There will be opportunities to see and touch live snakes, including our famous two-headed snake Tiger-Lily!



Rough greensnake



Turtles become active



Pileated woodpeckers drum to establish territories



**NATIONAL ARCHERY  
IN THE  
SCHOOLS PROGRAM**

Nearly everyone — regardless of age, size, or physical ability — can succeed at archery. The **Missouri National Archery in the Schools Program (MoNASP)** helps build stronger, more confident, and accomplished kids by teaching the basics of archery as part of school curriculum.

### School archery programs:

- ➔ Improve school attendance
- ➔ Increase self-esteem
- ➔ Increase physical activity
- ➔ Appeal to all students

Plus, an Archery Equipment Rebate program and maintenance grants are available.

Bring the program to your school! Learn more at [MDC.MO.GOV/MONASP](http://MDC.MO.GOV/MONASP)



# Places to Go

## SOUTHEAST REGION

### Coon Island Conservation Area

Wetlands, bottomland hardwoods offer birding, fishing opportunities

by Larry Archer

✧ As waterfowl and other spring migratory birds begin heading north, it's a good time for birders to be heading south. And Coon Island Conservation Area (CA) is about as far south as one can get and still be in Missouri.

Located south of Poplar Bluff just north of the Arkansas state line, this 3,223-acre combination of wetlands and bottomland hardwoods is an early stop on the way north for many migratory species, said Coon Island CA Manager Luke Wehmhoff.

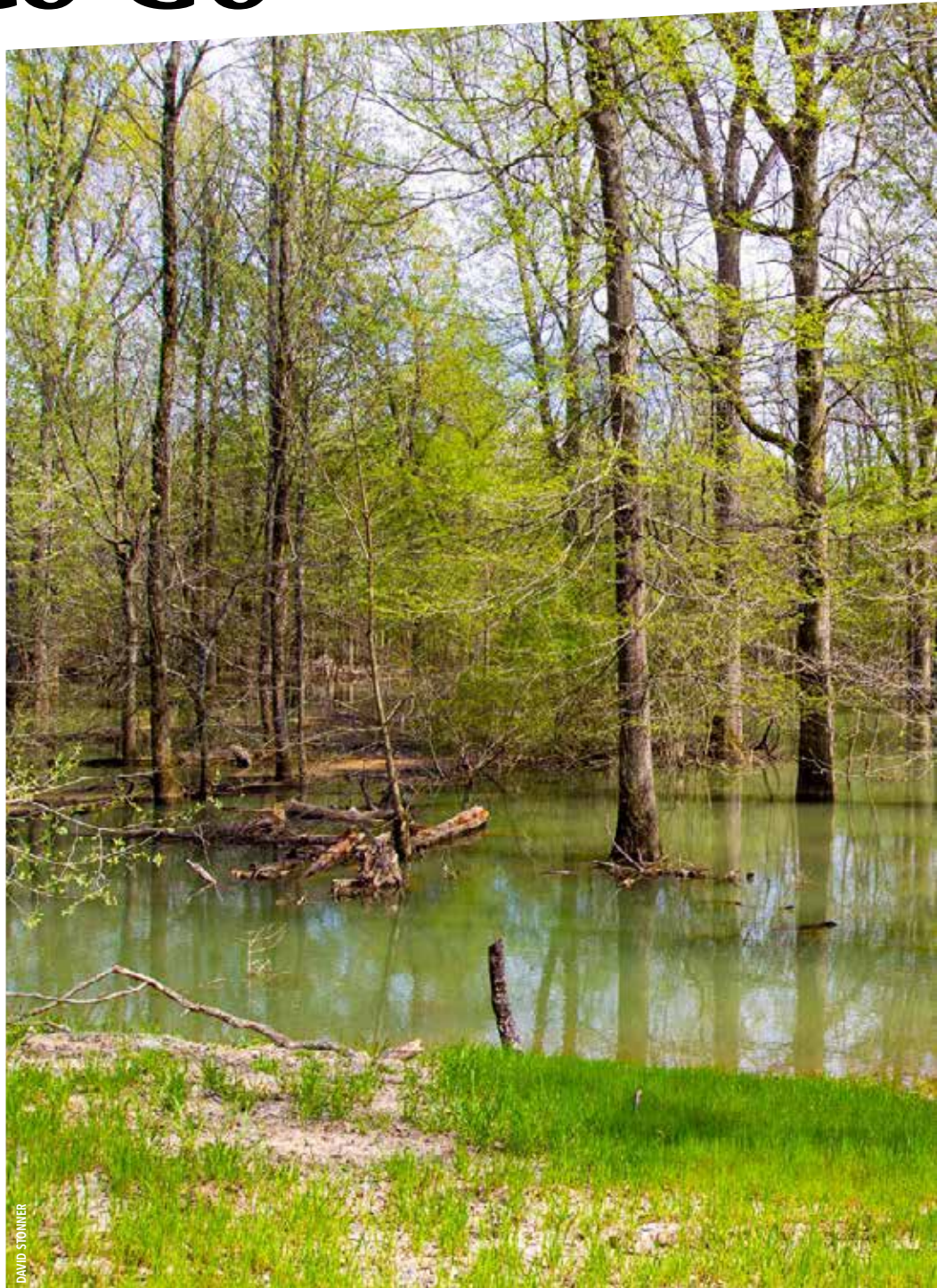
"It depends on when in March you're here, you may still have snow geese around and you may still have pintails around," Wehmhoff said. "Toward the end of the month, you're getting into blue-wing teals and shovelers."

The wetlands — and the waterfowl they attract — aren't the only draw for birders.

"It's a pretty big chunk of bottomland hardwood habitat — one of the bigger chunks in southern Butler County — so the Neotropical migrants may start filtering through, too," he said.

Anglers, using either rod and reel or bow, can take advantage of the Black River and its backwaters, Wehmhoff said.

"It's a real common time of year for it to be flooding," he said. "So, some people may bowfish in the flood waters down there."



DAVID STONNER

#### WHAT TO LOOK FOR WHEN YOU VISIT



Beaver



Red-eared slider

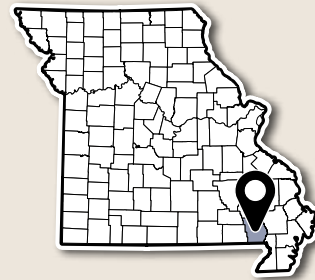


Nuttall's oak





The bottomland hardwoods of Coon Island Conservation Area are often under water when the nearby Black River floods. Even when flooded, the area is accessible by levees.



## COON ISLAND CONSERVATION AREA

consists of 3,223 acres in Butler County. From Poplar Bluff, take Highway 53 south, then Route HH south 8 miles, then County Road 244 east 1 mile.

N36° 33' 11.88" | W90° 20' 44.52"

[short.mdc.mo.gov/ZWT](http://short.mdc.mo.gov/ZWT) 573-624-5821

### WHAT TO DO WHEN YOU VISIT



**Birdwatching** The eBird list of birds recorded at Coon Island CA is available at [short.mdc.mo.gov/ZWq](http://short.mdc.mo.gov/ZWq).



**Camping** Individual campsites



**Fishing** Black bass, white bass, catfish, crappie, and sunfish



**Hiking** Hiking allowed on levees and on area access trail.



**Hunting Deer and turkey**

Deer and turkey regulations are subject to annual changes. Please refer to the Spring Turkey or Fall Deer and Turkey booklets for current regulations.

Also **rabbit** and **squirrel**



**Trapping** Special use permit required.

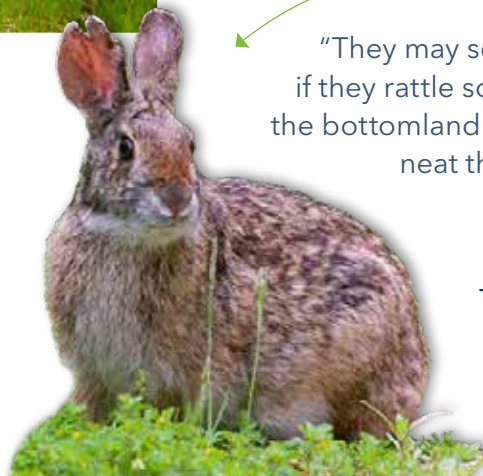


**Waterfowl Hunting** Open hunting. Waterfowl regulations are subject to annual change, so check the *Migratory Bird and Waterfowl Hunting Digest 2019-2020* for current regulations.



Mississippi kite

Bowfin



"They may see **swamp rabbits** if they rattle some bushes in some of the bottomland habitats, so it's kind of neat that you can see swamp rabbits as opposed to just cottontails."

—Coon Island CA Manager  
Luke Wehmhoff



# Wild Guide



## Coyote

*Canis latrans*

### Status

Common

### Size

Total length: 39-54 inches;  
weight: 18-30 pounds

### Distribution

Grassland habitat in northern and western Missouri, but increasing throughout the state



### Did You Know?

Coyotes can develop opportunistic feeding habits, picking off easy prey and accessible human food and trash. These habits can lead to conflicts with farmers, ranchers, and suburbanites. If you are experiencing nuisance coyotes, contact your local MDC wildlife-damage biologist, who can provide instruction, equipment, and assistance. For more information, visit [mdc.mo.gov/regional-contacts](https://mdc.mo.gov/regional-contacts).

Coyotes live in semiopen, brushy areas, along timber edges, and in open farmlands, occupying territories ranging from about 9 to nearly 30 square miles. Both male and female coyotes look very much alike. Their upperparts are light gray or dull yellow, with black-tipped hair. The backs of their ears are reddish and their muzzle is yellowish. Their throat and belly are white to pale gray.



### LIFE CYCLE

Coyotes mate in early spring and bear young by late April or May. Both parents rear the litter, which usually consists of five to seven pups, until they can hunt and behave like adults. Coyotes live singly, in male-female pairs, or in a pack. They are mostly nocturnal, but can be seen in the day.



### FOODS

Coyotes eat carrion as well as prey they kill themselves. Rabbits and mice make up almost two-thirds of their diet, while other animals and plants, including wild fruits, make up the rest. While 10 to 20 percent of a coyote's diet may include livestock, poultry, and farm-raised produce, putting them in direct conflict with humans, their remaining diet is neutral or even beneficial to the human population.



### HUMAN CONNECTIONS

Coyotes control rodent pests. Coyote pelts are durable and have long been used for scarves and trimming coats.



### ECOSYSTEM CONNECTIONS

Coyotes feed on smaller animals, keeping their populations in check. Similarly, they feed on sick, old, and injured animals. As scavengers, they feed on carcasses, thus keeping the natural landscape clean.



# Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖

## FISHING

### Black Bass

Impounded waters and non-Ozark streams:  
Open all year

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2020

### Nongame Fish Giggling

Impounded Waters, sunrise to sunset:  
Feb. 1–Sept. 14, 2020

### Paddlefish

Statewide:

March 15–April 30, 2020

On the Mississippi River:

March 15–May 15, 2020

Sept. 15–Dec. 15, 2020

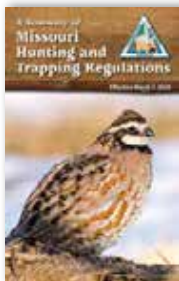
### Trout Parks

Catch-and-Keep:

March 1–Oct. 31, 2020

## Regulations Booklets Available

Get MDC's latest information on hunting, trapping, and fishing. Find *A Summary of Missouri Hunting and Trapping Regulations* at [short.mdc.mo.gov/ZZf](http://short.mdc.mo.gov/ZZf) and *A Summary of Missouri Fishing Regulations* at [short.mdc.mo.gov/ZUK](http://short.mdc.mo.gov/ZUK). Both publications are available in print where permits are sold.



## Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you buy permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at [short.mdc.mo.gov/Zi2](http://short.mdc.mo.gov/Zi2).

## HUNTING

### Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2020

### Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

### Crow

Nov. 1, 2019–March 3, 2020

### Deer

Archery:

Sept. 15–Nov. 13, 2020

Nov. 25, 2020–Jan. 15, 2021

Firearms:

- ▶ Early Youth Portion (ages 6–15):

Oct. 31–Nov. 1, 2020

- ▶ November Portion:

Nov. 14–24, 2020

- ▶ Late Youth Portion (ages 6–15):

Nov. 27–29, 2020

- ▶ Antlerless Portion (open areas only):

Dec. 4–6, 2020

- ▶ Alternative Methods Portion:

Dec. 26, 2020–Jan. 5, 2021

### Groundhog (woodchuck)

May 11–Dec. 15, 2020

### Pheasant

Youth (ages 6–15):

Oct. 24–25, 2020

Regular:

Nov. 1, 2020–Jan. 15, 2021

### Quail

Youth (ages 6–15):

Oct. 24–25, 2020

Regular:

Nov. 1, 2020–Jan. 15, 2021

### Rabbit

Oct. 1, 2020–Feb. 15, 2021

### Squirrel

May 23, 2020–Feb. 15, 2021

### Turkey

Archery:

Sept. 15–Nov. 13, 2020

Nov. 25, 2020–Jan. 15, 2021

Firearms:

- ▶ Youth (ages 6–15): April 4–5, 2020

- ▶ Spring: April 20–May 10, 2020

- ▶ Fall: Oct. 1–31, 2020

### Waterfowl

See the Waterfowl Hunting Digest or visit [short.mdc.mo.gov/ZZx](http://short.mdc.mo.gov/ZZx) for more information.

## TRAPPING

### Beaver, Nutria

Nov. 15, 2019–  
March 31, 2020



ILLUSTRATION: MARK RATHIEL

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at [short.mdc.mo.gov/Zib](http://short.mdc.mo.gov/Zib). Current hunting, trapping, and fishing regulation booklets are available from local permit vendors or online at [short.mdc.mo.gov/ZZf](http://short.mdc.mo.gov/ZZf).





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on Instagram**

@moconservation

You may start noticing some early indications of spring, including this black swallowtail butterfly enjoying the blooms of an eastern redbud. The black swallowtail overwinters as a chrysalis, emerging in spring. Missouri is home to many different species of native butterflies. Get out and discover these winged beauties.

📷 by **Noppadol Paothong**

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